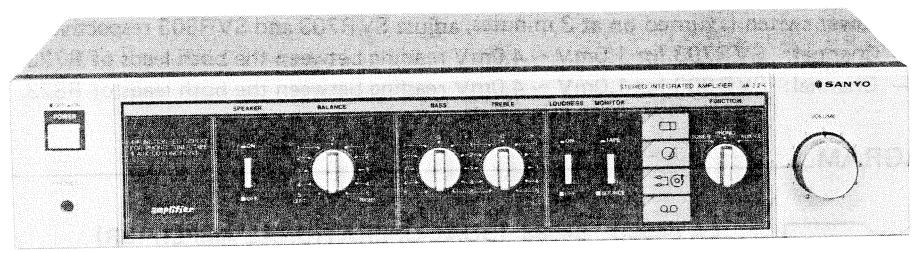
SERVICE MANUAL

POWER AMPLIFIER

SANYO

JA 224

(EUROPE)



SPECIFICATIONS

NOTE:
The below mentioned specifications are mainly based on the IHF measurements standard. They can therefore not directly be compared with specifications based on the DIN standard or other standards.

Continous output power	20 W x 2 (at 8 ohms, 0.9% distortion)
Input sensitivity and impedance	
PHONO	2.5mV/47 kohms
AUX-CD/TUNER/TAPE PLAY	150 mV/47 kohms
Phono overload level	130 mV RMS (at 1 kHz)
Output level	
TAPE REC	150 mV
Frequency response	20 – 20,000 Hz (AUX-CD)
Tone control response	
BASS	±8 dB (at 100 Hz)
TREBLE	±8 dB (at 10 kHz)
Loudness control response	
100 Hz/10 kHz	+8 dB/+4 dB
Signal to noise ratio	95 dB (AUX-CD)
Power requirements	AC: 220 V, 50 Hz
Power consumption	100 W
AC output socket	AC: 18 V, 200 mA (max.)
Dimension (Approx.)	420 (W) x 200 (D) x 80 (H) mm (16-1/2" x 7-7/8" x 3-1/8")
Weight (Approx.)	4 kg (9 lbs.)

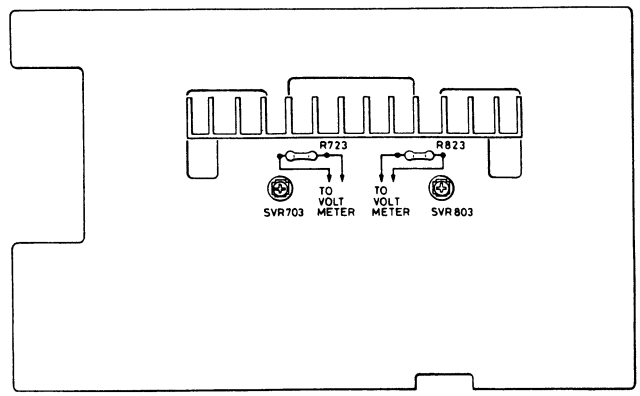
* Specifications subject to change without notice.

ADJUSTMENT

ADJUSTMENT OF BIAS

CONDITIONS

VOLUME Control	:	"O,, (Minimum)
BALANCE Control	:	"O,, (Center)
BASS Control	:	"O,, (Center)
TREBLE Control	:	"O,, (Center)
FUNCTION Switch	:	"AUX–CD,,
SPEAKER Switch	:	"ON,,
SOUDNESS Switch	:	"OFF,,
MONITOR Switch	:	"SOURCE,,
Output Load	:	No Load



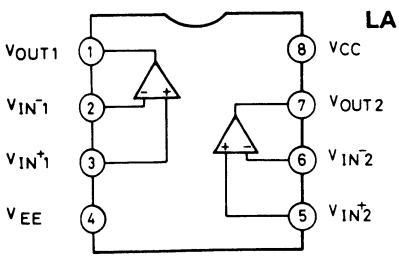
After the power switch is turned on at 3 minutes, adjust SVR703 and SVR803 respectively as follows.

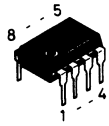
L – Channel: SVR703 for 1.0mV ~ 4.0mV reading between the both leads of R723.

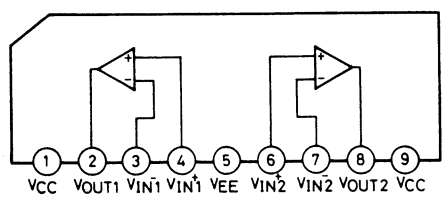
R – Channel: SVR803 for 1.0mV ~ 4.0mV reading between the both leads of R823.

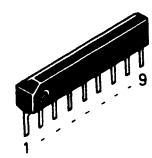
IC BLOCK DIAGRAM

LA 6458D 6458S (DUAL OPERATIONAL AMPLIFIER)









PARTS LIST

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.
Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

ELECTRICAL PARTS

NOTE:

* Materials of Capacitors are abbreviated as follows;

Elect., ...Electrolytic Capacitor
NP. Elect., ...Non-Polarized Electrolytic Capacitor
Mylar .....Mylar Film Capacitor
Polypro .....Polypropylene Capacitor
M. Polypro .....Metallized Polypropylene Capacitor
TF .....Thin Film Capacitor
EDL.....Electric Double Layer Capacitor

* Tolerance of Capacitor, Resistors and Other parts are noted with follow symboles;

A .....+75−10%
F .....±1%
G .....±2%
J .....±5%
K.....±10%
M .....±20%
N.....±30%
P .....+100−0%
Z .....+80−20%

PACKING & ACCESSORIES

Ref. No.	Parts No.	Description
	141 6 133T 49820	INNER CORR CASE (SILVER)
or	141 6 133T 49821	INNER CORR CASE (BROWN)
or	141 6 133T 49822	INNER CORR CASE (BLACK)
	141 6 235T 35601	INNER POLYE LAMINA COVER
	141 6 235T 35605	INNER POLYE LAMINA COVER
	141 6 409T 07606	INST MANUAL
	141 6 144T 93000	FOAM PLASTIC CASE
	141 6 415T 32300	NOTICE, FTZ

CABINET & CHASSIS

Ref. No.	Parts No.	Description
1	141 0 122T 53610	FRONT PANEL ASSY (SILVER)
or	141 0 122T 53635	FRONT PANEL ASSY (BROWN)
or	141 0 122T 53645	FRONT PANEL ASSY (BLACK)
2	141 2 111T 58230	CABINET (BROWN)
or	141 2 111T 58240	CABINET (SILVER)
or	141 2 111T 58270	CABINET (BLACK)
3	141 2 163T 81701	ROTARY KNOB, MAIN VOLUME (SILVER, BROWN)
or	141 2 163T 81741	ROTARY KNOB, MAIN VOLUME (BLACK)
4	141 2 163T 45401	ROTARY KNOB, BASS/TREBLE /BALANCE (SILVER,
or	141 2 163T 45441	ROTARY KNOB, BASS/TREBLE/BALANCE (BLACK)
5	141 2 163T 45400	ROTARY KNOB, FUNCTION (SILVER, BROWN)
or	141 2 163T 45450	ROTARY KNOB, FUNCTION (BLACK)
6	141 2 125T 31901	BOTTOM LID
7	141 2 126T 45219	BACK LID
8	141 2 310T 75001	BRACKET, HEAT SINK
9	141 2 310T 75101	BRACKET, HEAT SINK
10	141 2 310T 69700	BRACKET
11	141 2 161T 88601	PUSH BUTTON, SPEAKER /MONITOR (SILVER, BROWN)

Ref. No.	Parts No.	Description
11	141 2 161T 88641	PUSH BUTTON, SPEAKER/MONITOR (BLACK)
12	141 2 160T 16501	PUSH BUTTON, POWER SWITCH (SILVER, BROWN)
or	141 2 160T 16541	PUSH BUTTON, POWER SWITCH (BLACK)
13	141 2 464T 14400	FIXER, AC POWER CORD
14	141 2 464T 29900	FIXER, TUNER AC
15	141 2 174T 13100	STAND
16	141 6 479T 62300	LABEL, 110/220V
Y1	141 2 421T 28800	SPECIAL SCREW
Y2	141 2 421T 43901	SPECIAL SCREW
Y3	141 2 415T 02500	HEXAGON NUT
Y4	BJBYS++3+8+Z1	S M BIND H 3X8Z1
Y5	BJX6S++3+8+Z1	S T WASHER H 3X8Z1
Y6	BJX6S++310+Z1	S T WASHER H 3X10Z1
Y7	BJB2S++3+8+Z1	S T BIND H 3X8Z1 (SILVER)
or	BJB2S++310+ZK	ST BIND H 3X10 ZK (BLACK, BROWN)
Y8	BJB2S++3+8+N1	S T BIND H 3X8N1 (SILVER)
or	BJB2S++3+8+ZK	ST BIND H 3X8 ZK (BLACK, BROWN)
Y10	BJESS++4+8+Z1	S M BIND H 4X8Z1
Y11	WJBWS++3J10C1	WASHER 3
Y12	WJHGK++3K0CZ1	TH LOCK WASHER 3
Y13	BJX6S++3+6+Z1	S T WASHER H 3X6Z1

ELECTRICAL PARTS

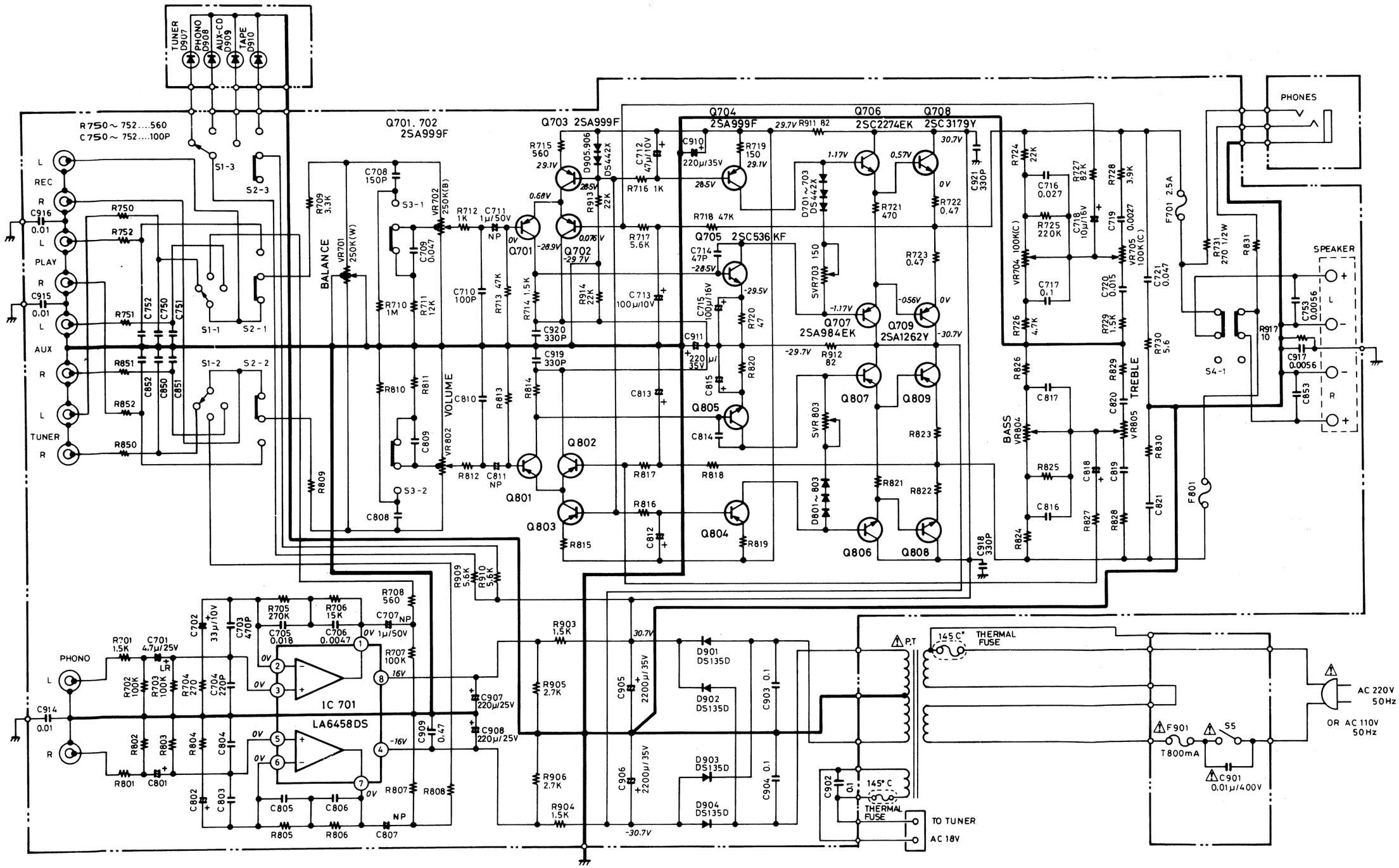
Ref. No.	Parts No.	Description
51	⚠ 4 300T 70300	POWER TRANSFORMER
52	⚠ 4 243T 84973	AC POWER CORD
53	4 280T 26100	P.C BOARD, TRANSFORMER
54	4 234T 10589	FUSE, T 2.5A, 250V
55	141 2 368T 26101	HEAT SINK
56	141 2 243T 09800	BASE
57	141 2 327T 26100	INSULATOR
58	4 240T 16572	SOCKET, TUNER AC
59	4 240T 83573	SOCKET, HEADPHONE PCB, 3P

PARTS LIST

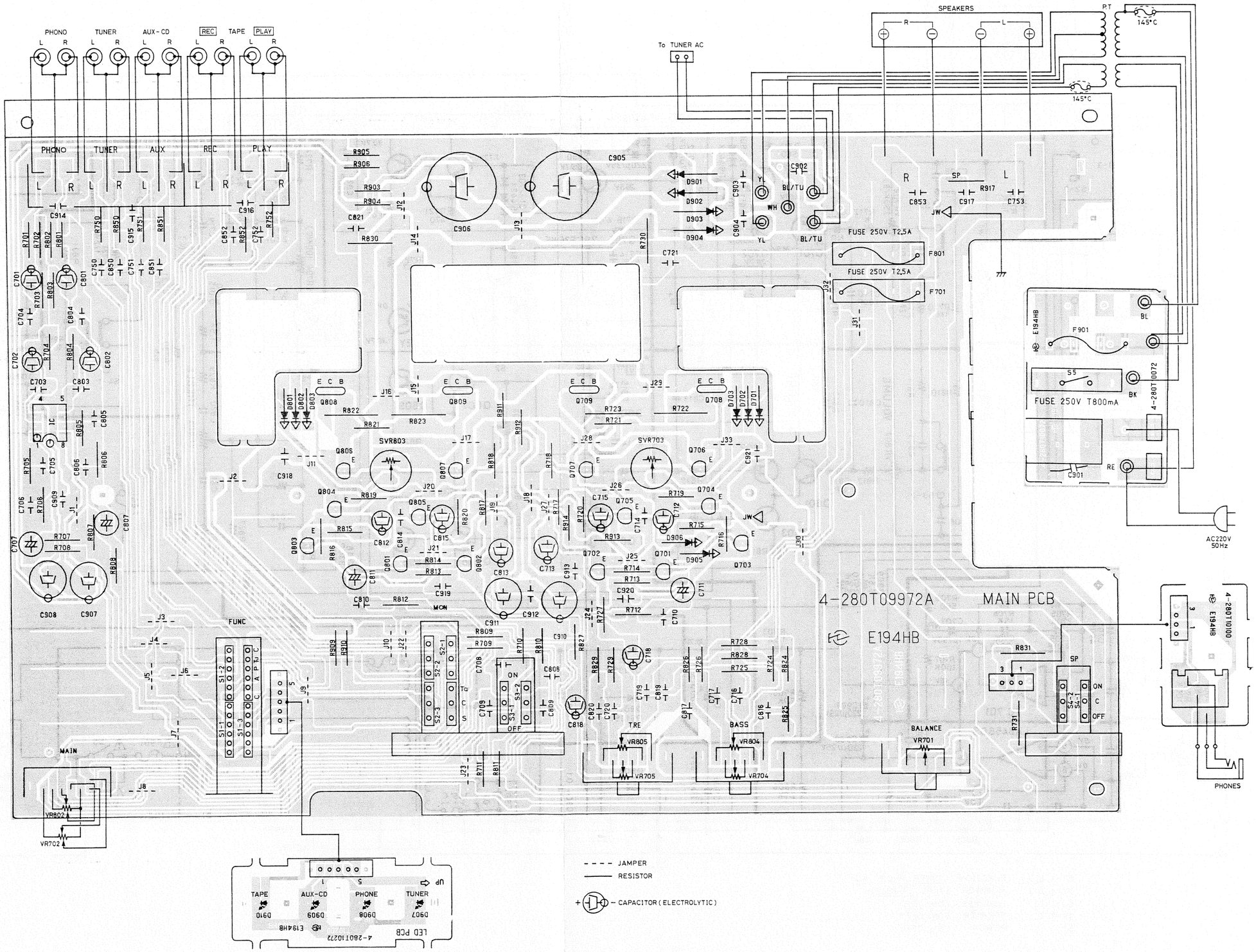
Ref. No.	Parts No.	Description
60	4 240T 83575	SOCKET, 5P
66	⚠ 4 234T 10583	FUSE, T 800MA, 250V

MAIN AMP P.C.B. ASSY

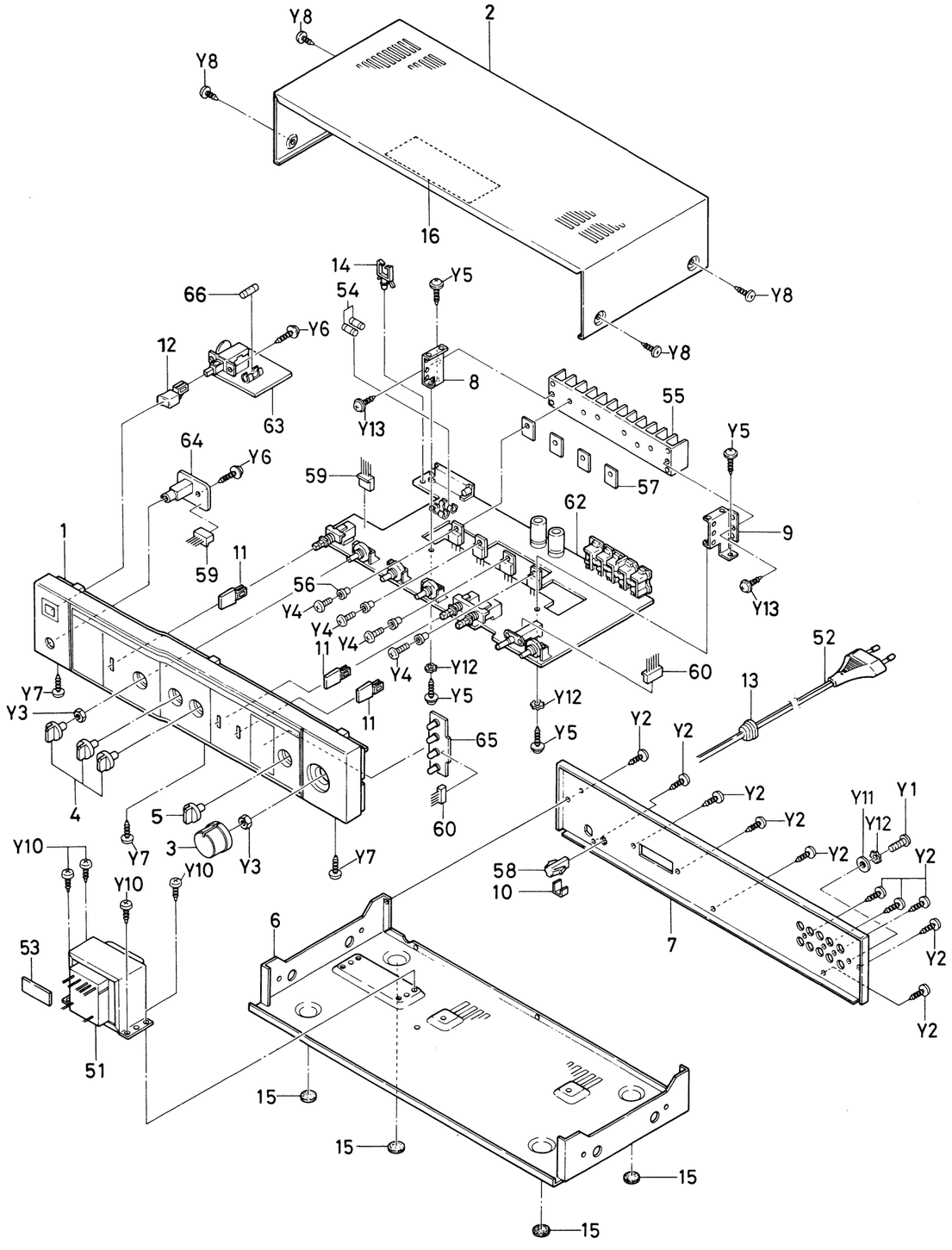
Ref. No.	Parts No.	Description
62	141 4 280T 09972	P.C BOARD ASSY, MAIN AMP
	4 240T 50400	SOCKET, RCA 4P
	4 240T 50572	SOCKET
	4 220T 13000	VARIABLE RESISTOR, MAIN
	4 220T 12900	VARIABLE RESISTOR, BALANCE
	4 220T 13100	VARIABLE RESISTOR, BASS/TREBLE
	4 237T 09991	TERMINAL BOARD
	141 2 381T 04202	BRACKET, FUSE
	4 237T 00100	TERMINAL BOARD
S1	4 238T 60900	ROTARY SWITCH, FUNCTION
S2,S3	4 238T 73700	SWITCH, LOUDNESS/MONITOR
S4	4 238T 73600	SWITCH, SPEAKER
SVR703	4 222T 73595	SEMI-FIXED RESISTOR
SVR803	4 222T 73595	SEMI-FIXED RESISTOR
IC701	SILA6458DS+++	IC LA6458DS DIP08
Q701	STA999+F+++NU	TR 2SA999 F L
Q702	STA999+F+++NU	TR 2SA999 F L
Q703	STA999+F+++++	TR 2SA999 F
Q704	STA999+F+++++	TR 2SA999 F
Q705	STC2362G+++++	TR 2SC2362 G
Q706	STC2274E+++K+	TR 2SC2274 E K
Q707	STA984+E+++K+	TR 2SA984 E K
Q708	STC3179Y+++++	TR 2SC3179 Y
Q709	STA1262Y+++++	TR 2SA1262 Y
Q801	STA999+F+++NU	TR 2SA999 F L
Q802	STA999+F+++NU	TR 2SA999 F L
Q803	STA999+F+++++	TR 2SA999 F
Q804	STA999+F+++++	TR 2SA999 F
Q805	STC2362G+++++	TR 2SC2362 G
Q806	STC2274E+++K+	TR 2SC2274 E K
Q807	STA984+E+++K+	TR 2SA984 E K
Q808	STC3179Y+++++	TR 2SC3179 Y
Q809	STA1262Y+++++	TR 2SA1262 Y
D701	SDDS442+X+++T	DIODE DS442 X
D702	SDDS442+X+++T	DIODE DS442 X
D703	SDDS442+X+++T	DIODE DS442 X
D801	SDDS442+X+++T	DIODE DS442 X
D802	SDDS442+X+++T	DIODE DS442 X
D803	SDDS442+X+++T	DIODE DS442 X
D901	SDDS135+D+++L	DIODE DS135 D L
D902	SDDS135+D+++L	DIODE DS135 D L
D903	SDDS135+D+++L	DIODE DS135 D L
D904	SDDS135+D+++L	DIODE DS135 D L
D905	SDDS442+X+++T	DIODE DS442 X
D906	SDDS442+X+++T	DIODE DS442 X
C701	CE+25475RR++F	ELECT 4.7MF 25V R R
C702	CE+10336QR++F	ELECT 33MF 10R Q R
C703	CC+50471KRSLF	CERAMIC 470PF 50V K R SL
C704	CC+50221KRSLF	CERAMIC 220PF 50V K R SL
C705	CB+25183KRXRF	BC CON 0.018MF 25V K R XR
C706	CB+25472KRXRF	BC CON 0.0047MF 25V K R XR
C707	CW+50105QRNPF	NONPOLAR 1MF 50V Q R NP
C708	CC+50151KRSLF	CERAMIC 150PF 50V K R SL
C709	CM+50473KR++F	MYLAR 0.047MF 50V K R
C710	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C711	CW+50105QRNPF	NONPOLAR 1MF 50V Q R NP
C712	CE+10476QR++F	ELECT 47MF 10V Q R
C713	CE+10107QR++F	ELECT 100MF 10V Q R
C714	CC+50470KRSLF	CERAMIC 47PF 50V K R SL
C715	CE+16107QR++F	ELECT 100MF 16V Q R
C716	CB+25223KRXRF	BC CON 0.022MF 25V K R XR
C717	CB+25104KRXRF	BC CON 0.1MF 25V K R XR
C718	CE+16106QR++F	ELECT 10MF 16V Q R
C719	CB+25272KRXRF	BC CON 0.0027MF 25V K R XR
C720	CB+25153KRXRF	BC CON 0.015MF 25V K R XR
C721	CM+50473MR++F	MYLAR 0.047MF 50V M R
C750	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C751	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C752	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C753	CM+50562MR++F	MYLAR 0.0056MF 50V M R
C801	CE+25475RR++F	ELECT 4.7MF 25V R R
C802	CE+10336QR++F	ELECT 33MF 10R Q R
C803	CC+50471KRSLF	CERAMIC 470PF 50V K R SL
C804	CC+50221KRSLF	CERAMIC 220PF 50V K R SL
C805	CB+25183KRXRF	BC CON 0.018MF 25V K R XR
C806	CB+25472KRXRF	BC CON 0.0047MF 25V K R XR
C807	CW+50105QRNPF	NONPOLAR 1MF 50V Q R NP
C808	CC+50151KRSLF	CERAMIC 150PF 50V K R SL
C809	CM+50473KR++F	MYLAR 0.047MF 50V K R
C810	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C811	CW+50105QRNPF	NONPOLAR 1MF 50V Q R NP
C812	CE+10476QR++F	ELECT 47MF 10V Q R
C813	CE+10107QR++F	ELECT 100MF 10V Q R
C814	CC+50470KRSLF	CERAMIC 47PF 50V K R SL
C815	CE+16107QR++F	ELECT 100MF 16V Q R
C816	CB+25223KRXRF	BC CON 0.022MF 25V K R XR
C817	CB+25104KRXRF	BC CON 0.1MF 25V K R XR
C818	CE+16106QR++F	ELECT 10MF 16V Q R
C819	CB+25272KRXRF	BC CON 0.0027MF 25V K R XR
C820	CB+25153KRXRF	BC CON 0.015MF 25V K R XR
C821	CM+50473MR++F	MYLAR 0.047MF 50V M R
C850	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C851	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C852	CC+50101KRSLF	CERAMIC 100PF 50V K R SL
C853	CM+50562MR++F	MYLAR 0.0056MF 50V M R
C902	CM+50104MR++F	MYLAR 0.1MF 50V M R
C903	CM+50104MR++F	MYLAR 0.1MF 50V M R
C904	CM+50104MR++F	MYLAR 0.1MF 50V M R
C905	CE+35228QY++S	ELECT 2200MF 35V Q Y
C906	CE+35228QY++S	ELECT 2200MF 35V Q Y
C907	CE+25227QY++S	ELECT 220MF 25V Q Y
C908	CE+25227QY++S	ELECT 220MF 25V Q Y
C909	CC+50473ZRZFF	CERAMIC 0.047MF 50V Z R ZF
C910	CE+35227QY++S	ELECT 220MF 35V Q Y
C911	CE+35227QY++S	ELECT 220MF 35V Q Y
C914	CC+50103ZRZFF	CERAMIC 0.01MF 50V Z R ZF
C915	CC+50103ZRZFF	CERAMIC 0.01MF 50V Z R ZF
C916	CC+50103ZRZFF	CERAMIC 0.01MF 50V Z R ZF
C917	CC+50331KRSLF	CERAMIC 330PF 50V K R SL
C918	CC+50331KDSLS	CERAMIC 330PF 50V K D SL
C919	CC+50331KRSLF	CERAMIC 330PF 50V K R SL
C920	CC+50331KDSLS	CERAMIC 330PF 50V K D SL
C921	CC+50331KRSLF	CERAMIC 330PF 50V K R SL
R701	RC/+4152JT++R	CARBON T 1.5K OHM J1/4WR25
R702	RC/+4104JT++R	CARBON T 100K OHM J1/4WR25
R703	RC/+4104JT++R	CARBON T 100K OHM J1/4WR25
R704	RC/+4271JT++R	CARBON T 270 OHM J1/4WR25
R705	RC/+4274JT++R	CARBON T 270K OHM J1/4WR25
R706	RC/+4153JT++R	CARBON T 15K OHM J1/4WR25
R707	RC/+4104JT++R	CARBON T 100K OHM J1/4WR25
R708	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R709	RC/+4332JT++R	CARBON T 3.3K OHM J1/4WR25
R710	RC/+4105JT++R	CARBON T 1M OHM J1/4WR25
R711	RC/+4123JT++R	CARBON T 12K OHM J1/4WR25
R712	RC/+4102JT++R	CARBON T 1K OHM J1/4WR25
R713	RC/+4473JT++R	CARBON T 47K OHM J1/4WR25
R714	RC/+4152JT++R	CARBON T 1.5K OHM J1/4WR25
R715	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R716	RC/+4102JT++R	CARBON T 1K OHM J1/4WR25
R717	RC/+4562JT++R	CARBON T 5.6K OHM J1/4WR25
R718	RC/+4473JT++R	CARBON T 47K OHM J1/4WR25
R719	RC/+4151JT++R	CARBON T 150 OHM J1/4WR25
R720	RC/+4470JT++R	CARBON T 47 OHM J1/4WR25
R721	RC/+4471JT++R	CARBON T 470 OHM J1/4WR25
R722	RM++1R47JS+++	METAL S 0.47 OHM J 1W



S1-1, 2, 3 FUNCTION (TUNER, PHONO, AUX)
S2-1, 2, 3 MONITOR (TAPE, SOURCE)
S3-1, 2 LOUDNESS (ON, OFF)
S4-1, 2 SPEAKER (ON, OFF)
S5 POWER (ON, OFF)


PHONO
TUNER
AUX-CD
REC
TAPE
PLAY
SPEAKERS
To TUNER AC
P.T
145°C
FUSE 250V T2,5A
F801
F701
FUSE 250V T800mA
F901
E194HB
4-280T10072
AC220V 50Hz
4-280T09972A MAIN PCB
E194HB
4-280T10100
PHONES
FUNC
MAIN
LED PCB
4-280T10272
E194HB
TAPE
AUX-CD
PHONE
TUNER
TRE
BASS
BALANCE
VR805
VR804
VR701
VR705
VR704
VR802
VR702
SVR803
SVR703
SP
ON
OFF
BL
BK
RE
WH
YL
BL/TU
JW
C905
C906
C907
C908
MON
- - - - JAMPER
—— RESISTOR
+ – CAPACITOR (ELECTROLYTIC)

EXPLODED VIEW



PARTS LIST

Ref. No.	Parts No.	Description
R723	RM++1R47JS+++	METAL S 0.47 OHM J 1W
R724	RC/+4223JT++R	CARBON T 22K OHM J1/4WR25
R725	RC/+4224JT++R	CARBON T 220K OHM J1/4WR25
R726	RC/+4472JT++R	CARBON T 4.7K OHM J1/4WR25
R727	RC/+4823JT++R	CARBON T 82K OHM J1/4WR25
R728	RC/+4392JT++R	CARBON T 3.9K OHM J1/4WR25
R729	RC/+4152JT++R	CARBON T 1.5K OHM J1/4WR25
R730	RF/+25R6JSFP+	FP-CARBON S 5.6 J 1/2W
R731	RF/+2271JPFP+	FP-CARBON P 270 J 1/2W
R750	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R751	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R752	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R801	RC/+4152JT++R	CARBON T 1.5K OHM J1/4WR25
R802	RC/+4104JT++R	CARBON T 100K OHM J1/4WR25
R803	RC/+4104JT++R	CARBON T 100K OHM J1/4WR25
R804	RC/+4271JT++R	CARBON T 270 OHM J1/4WR25
R805	RC/+4274JT++R	CARBON T 270K OHM J1/4WR25
R806	RC/+4153JT++R	CARBON T 15K OHM J1/4WR25
R807	RC/+4104JT++R	CARBON T 100K OHM J1/4WR25
R808	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R809	RC/+4332JT++R	CARBON T 3.3K OHM J1/4WR25
R810	RC/+4105JT++R	CARBON T 1M OHM J1/4WR25
R811	RC/+4123JT++R	CARBON T 12K OHM J1/4WR25
R812	RC/+4102JT++R	CARBON T 1K OHM J1/4WR25
R813	RC/+4473JT++R	CARBON T 47K OHM J1/4WR25
R814	RC/+4152JT++R	CARBON T 1.5K OHM J1/4WR25
R815	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R816	RC/+4102JT++R	CARBON T 1K OHM J1/4WR25
R817	RC/+4562JT++R	CARBON T 5.6K OHM J1/4WR25
R818	RC/+4473JT++R	CARBON T 47K OHM J1/4WR25
R819	RC/+4151JT++R	CARBON T 150 OHM J1/4WR25
R820	RC/+4470JT++R	CARBON T 47 OHM J1/4WR25
R821	RC/+4471JT++R	CARBON T 470 OHM J1/4WR25
R822	RM++1R47JS+++	METAL S 0.47 OHM J 1W
R823	RM++1R47JS+++	METAL S 0.47 OHM J 1W
R824	RC/+4223JT++R	CARBON T 22K OHM J1/4WR25
R825	RC/+4224JT++R	CARBON T 220K OHM J1/4WR25
R826	RC/+4472JT++R	CARBON T 4.7K OHM J1/4WR25
R827	RC/+4823JT++R	CARBON T 82K OHM J1/4WR25
R828	RC/+4392JT++R	CARBON T 3.9K OHM J1/4WR25
R829	RC/+4152JT++R	CARBON T 1.5K OHM J1/4WR25
R830	RF/+25R6JSFP+	FP-CARBON S 5.6 J 1/2W
R831	RF/+2271JPFP+	FP-CARBON P 270 J 1/2W
R850	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R851	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R852	RC/+4561JT++R	CARBON T 560 OHM J1/4WR25
R903	RF/+4152JSFPR	FP-CARBON S 1.5K J1/4WR25
R904	RF/+4152JSFPR	FP-CARBON S 1.5K J1/4WR25
R905	RC/+4272JT++R	CARBON T 2.7K OHM J1/4WR25
R906	RC/+4272JT++R	CARBON T 2.7K OHM J1/4WR25
R909	RC/+4562JT++R	CARBON T 5.6K OHM J1/4WR25
R910	RC/+4562JT++R	CARBON T 5.6K OHM J1/4WR25
R911	RF/+4820JSFPR	FP-CARBON S 82 J 1/4W R25
R912	RF/+4820JSFPR	FP-CARBON S 82 J 1/4W R25
R913	RC/+4223JT++R	CARBON T 22K OHM J1/4WR25
R914	RC/+4223JT++R	CARBON T 22K OHM J1/4WR25
R917	RC/+4100JT++R	CARBON T 10 OHM J1/4WR25

LED P.C.B. ASSY

Ref. No.	Parts No.	Description
65	141 4 280T 10272	P.C BOARD ASSY, LED
D907	SLSLP138CB5RE	LED SLP138C-51 B RED
D908	SLSLP138CB5RE	LED SLP138C-51 B RED
D909	SLSLP138CB5RE	LED SLP138C-51 B RED
D910	SLSLP138CB5RE	LED SLP138C-51 B RED

POWER SWITCH P.C.B. ASSY

Ref. No.	Parts No.	Description
63	141 4 280T 10072	P.C BOARD ASSY, POWER SWITCH
	141 2 381T 04202	BRACKET, FUSE
	141 2 382T 18900	TERMINAL
	4 237T 00100	TERMINAL BOARD
	141 2 135T 75700	COVER
S5	⚠ 4 238T 70380	SWITCH, POWER
C901	⚠ 4 223T 12100	CAPACITOR, 0.01MF, 400V

HEADPHONE SOCKET P.C.B. ASSY (SILVER)

Ref. No.	Parts No.	Description
64	141 4 280T 10100	P.C BOARD ASSY, HEADPHONE SOCKET
	4 240T 09171	SOCKET, HEADPHONE

HEADPHONE SOCKET P.C.B. ASSY (BLACK, BROWN)

Ref. No.	Parts No.	Description
64	141 4 280T 10101	P.C BOARD ASSY, HEADPHONE SOCKET
	4 240T 99271	SOCKET, HEADPHONE